

PATENT COOPERATION TREATY

REC'D 05 AUG 2005

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From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

6/10

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/IB2005/050829

International filing date (day/month/year)
07.03.2005

Priority date (day/month/year)
25.03.2004

International Patent Classification (IPC) or both national classification and IPC
H04L1/00, H03M13/23

Applicant
KONINKLIJKE PHILIPS ELECTRONICS N.V.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for International preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2005/050829

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. II Priority

1. ☒ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43*bis*.1 and 64.1) is the claimed priority date.
2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2005/050829

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	3-27
	No: Claims	1,2
Inventive step (IS)	Yes: Claims	7,13,16,19,21-23,25-27
	No: Claims	1-6,8-12,14,15,17,18,20,24
Industrial applicability (IA)	Yes: Claims	1-27
	No: Claims	

2. Citations and explanations

see separate sheet

1. Reference is made to the following document:

D1: DIVSALAR D ET AL: "THE DESIGN OF TRELLIS CODED MPSK FOR FADING CHANNELS: PERFORMANCE CRITERIA" IEEE TRANSACTIONS ON COMMUNICATIONS, IEEE INC. NEW YORK, US, vol. 36, no. 9, 1 September 1988 (1988-09-01), pages 1004-1011, XP000026970 ISSN: 0090-6778

2. The application does not meet the requirements of Article 6 PCT, because the claims are not clear.

- 2.1 The independent claims do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claims attempt to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.

This clarity problem affects all the independent claims but is specially severe in case of the independent claim 1. From the wording of the claim, the convolutional code is generated "according to a predefined criteria" so that "the coded data are suitable for propagation in multipath fading channel". Such wording does not convey any technical feature, because any convolutional code is "suitable for" all kinds of channels introducing errors. The technical features which characterize the code and that should be present in claim 1 appear in dependent claim 3.

- 2.2 The independent claims 8 and 17 are meant to protect a decoding method and apparatus by referring to the way in which the convolutional code has been generated. However, the generation of the code, i.e. the search criterium, does not characterize at all neither the decoding process nor the decoding apparatus. The technical features of the decoding side can only be derived from the finally chosen convolutional code, as it determines the trellis and the associated decoding operations.

3. Furthermore, the above-mentioned lack of clarity notwithstanding, the subject-matter

of the independent claim 1 is not new in the sense of Article 33(2) PCT and the subject-matter of the independent claims 8,14,17,20,24 does not involve an inventive step in the sense of Article 33(3) PCT. Therefore, the criteria of Article 33(1) PCT are not met.

3.1 Document D1 (see abstract; figures 1 and 2; Example B on pages 1008 and 1009, figure 3; Conclusions on page 1010, left column) a method to design TCM codes for the Rayleigh channel. Note that TCM codes are a serial concatenation of convolutional codes and MPSK modulation. For instance, the example B. on pages 1008-1009 of D1 refers to a $\frac{1}{2}$ convolutional code followed by QPSK modulation. The subject matter of claim 1 is therefore not new.

3.2 D1 concludes that the codes should be designed to maximize the length and the product of Euclidean distances for the shortest error event path. D1 maximizes the product and not the sum of the Euclidean distances. Further, D1 does not disclose neither a corresponding decoder nor decoding method nor apparatuses or systems applying the disclosed code search criteria. Consequently, the independent claims 8,14,17,20 and 24 are new.

— However, no inventive merit is appreciated in replacing the product by a sum during the optimization phase. The basic idea is to separate as much as possible the correct decoding path from the shortest error event path; to maximize the sum or the product are known equivalent alternatives pursuing the same goal. Additionally, the physical implementation of the method taught by D1 is straight forward and does not convey any inventive merit. Thus, the subject matter of claims 8,14,17,20 and 24 is not inventive in the sense of Art. 33(3) PCT. —

4. The additional features of the dependent claim 2 are found in D1 and therefore the subject matter of the claim is not novel (Art. 33(2) PCT),
The additional features of the dependent claims 3-6, 9-12, 15 and 18 belong to the common technical knowledge in the field of error correction and therefore the subject matter of these claims is not inventive (Art. 33(3) PCT).

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/IB2005/050829

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2005/050829

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/IB2005/050829

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	3-27
	No: Claims	1,2
Inventive step (IS)	Yes: Claims	7,13,16,19,21-23,25-27
	No: Claims	1-6,8-12,14,15,17,18,20,24
Industrial applicability (IA)	Yes: Claims	1-27
	No: Claims	

2. Citations and explanations

see separate sheet

1. Reference is made to the following document:

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- 2.1 The independent claims do not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The claims attempt to define the subject-matter in terms of the result to be achieved, which merely amounts to a statement of the underlying problem, without providing the technical features necessary for achieving this result.

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3. Furthermore, the above-mentioned lack of clarity notwithstanding, the subject-matter

of the independent claim 1 is not new in the sense of Article 33(2) PCT and the subject-matter of the independent claims 8,14,17,20,24 does not involve an inventive step in the sense of Article 33(3) PCT. Therefore, the criteria of Article 33(1) PCT are not met.

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4. The additional features of the dependent claim 2 are found in D1 and therefore the subject matter of the claim is not novel (Art. 33(2) PCT),
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